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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/591,611	10/15/2006	Daniel McStay	27667U	3396

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EXAMINER	
BENNETT, JENNIFER D	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/591,611	MCSTAY ET AL.	
	Examiner	Art Unit	
	JENNIFER BENNETT	2878	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 23 October 2009.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1,4-6,8,9,12,16,18,20-37 and 39-43 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1,4-6,8,9,12,16,18,20-37 and 39-43 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on October 23, 2009 has been entered.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1, 4, 5, 12, 16, 20, 23 and 41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hjertman et al. (US 6858846).

Re claim 1: Hjertman teaches fluorometer comprising an excitation system (transmitter 6) including an excitation source for producing excitation light capable of causing fluorescence in fluorescent material (col. 10, lines 18-23, lines 33-37); and a detection system for detecting said fluorescence (receiver 8), wherein said excitation system comprises an excitation source comprising one or more light emitting diodes (LEDs) (col. 10, lines 18-27), the excitation system further comprising means to cause

said excitation light to form, in use, a generally conical divergent beam projecting from the fluorometer (col. 12, lines 9-11) (see fig. 1a the beam is cone shape), said beam causing means comprising at least one lens (col. 21, lines 1-12), said excitation system further including means for modulating beam with a modulating signal having a modulating frequency (col. 21, lines 1-12), and wherein said detection system (receiver 8) comprises means for receiving light and for converting said received light into a corresponding electrical signal (col. 10, lines 33-35, these elements convert light to an electrical signal), and at least one lens arranged to direct said received light onto said light receiving and converting means (col. 10, lines 48-51 and 62), wherein said at least one lens of the detection system is arranged to provide a generally conical convergent detection volume for the detection system (see fig. 1a the beam is cone converging on the detector), said generally conical detection volume converging in a direction towards said fluorometer and at least partially overlapping with said generally conical divergent beam (see fig. 1a) and wherein said detection system further includes means for detecting (receiver 8), in the electrical signal produced by said light receiving and converting means (col. 10, lines 33-35), a signal component of substantially the same frequency as said modulation frequency (col. 21, lines 12-14), said detecting means including means for performing spectral analysis of said electrical signal and means for determining the value of a spectral component of said electrical signal corresponding to said modulation frequency (col.12, lines 39-51) (see fig. 3), such that the fluorometer (this device is used to measure parameters of fluorescence therefore it is a fluorometer) is capable of detecting fluorescent material located remotely from the fluorometer (see

fig. 1a, the container is remote from the detection system, also since teaches the diverging beam and conical shapes of the transmitted and detection beams the system could be used at larger distances if need be). Hjertman does not specifically mention that the lens is a collimating lens. It is well known in the art to use a basic converging lens and place the light source at the principal focus of the lens to get a collimated beam output and if one wanted diverging beams one would move the light source closer to the lens itself. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use a collimating lens with the excitation source of Hjertman and still maintain the diverging conical shape of the beam and having further control of how much or little the beam is diverged dependent on the object or scene being illuminated for measurement (Hjertman, col. 12, lines 10-11).

Re claim 4: Hjertman teaches a fluorometer (see fig. 1a), wherein said excitation system comprises an excitation source comprising one or more light emitting diodes (LEDs) (col. 10, lines 18-27), the excitation system further comprising means to cause said excitation light to form, in use, a generally conical divergent beam projecting from the fluorometer (col. 12, lines 9-11) (see fig. 1a the beam is cone shape), said beam causing means comprising at least one lens (col. 21, lines 1-12). Hjertman does not specifically teach wherein said excitation source is located substantially at the focal point of the nearest to the excitation source of said at least one lens. It is well known in the art or anyone who deals with optics that if the light source is at the focal point of a collimator and the beams from the light source are diverging outward from the light source that the combination would create a collimated beam. The collimated beam

would not be a perfect collimated beam there may be some slight divergence of convergence because of the imperfection in the lens piece. One of ordinary skill in the art would have understood in order to get a nice spread of the beam with the light source at the focal point of the collimator one would have to use another lens, preferably a diverging lens piece, which would spread the beam of light to create a diverging beam. Since, Hjertman already teaches a diverging beam and an optic system to create and control the divergence of the beam (col. 12, lines 10-11), it would have been obvious to one of ordinary skill to use the appropriate lens set up in the system to provide for better control of the beam and a sufficient enough spread in the beam to cover a proper amount of area at a remote location form the detection system (Hjertman, col. 12, lines 10-11).

Re claim 5: Hjertman teaches a fluorometer (see fig. 1a), wherein said excitation system comprises an excitation source comprising one or more light emitting diodes (LEDs) (col. 10, lines 18-27), the excitation system further comprising means to cause said excitation light to form, in use, a generally conical divergent beam projecting from the fluorometer (col. 12, lines 9-11) (see fig. 1a the beam is cone shape), said beam causing means comprising at least one lens (col. 21, lines 1-12). Hjertman does not specifically teach a collimator. It is well known in the art to use a basic converging lens and place the light source at the principal focus of the lens to get a collimated beam output, this is a collimator (Chambers Science and Technology Dictionary, collimator (Phys.)), and if one wanted diverging beams one would move the light source closer to the lens itself. It would have been obvious to one of ordinary skill in the art at the time

the invention was made to use a collimator with the excitation source of Hjertman and still maintain the diverging conical shape of the beam and having further control of how much or little the beam is diverged dependent on the object or scene being illuminated for measurement (Hjertman, col. 12, lines 10-11).

Re claim 12: Hjertman teaches a fluorometer, wherein said light receiving and converting means comprises a photodetector (col. 10, lines 33-35).

Re claim 16: Hjertman teaches a fluorometer, wherein said light receiving and converting means (receiver 8) is located substantially at the focal point of the nearest to said light receiving and converting means of said at least one lens (col. 10, lines 44-62, the image is focused on the array of detectors, therefore the array must be at the focal point of at least one lens system).

Re claim 20: Hjertman teaches a fluorometer (fig. 1a), wherein the excitation system (6) and the detection system (8) are each provided in a respective housing (all of the elements are in a housing structure), the respective housings being located adjacent one another and arranged such that there is an overlap, during use, between said generally conical divergent beam excitation beam the excitation system housing and said generally conical convergent detection volume of the detection system housing (col. 13, lines 34-41 since the detection system and the excitation system can be placed at different angle with respect to each other then they would each be in a respective housing with the different elements and lens systems).

Re claim 23: Hjertman teaches a fluorometer, wherein the excitation system and the detection system are located in a common housing (col. 10, lines 1-10).

Re claim 41: Hjertman teaches a fluorometer, wherein the respective housings have a respective longitudinal axis, said longitudinal axes being substantially parallel with one another (col. 13, lines 24-39), and said generally conical divergent beam and said generally conical convergent detection volume are substantially aligned with said respective longitudinal axis (see fig. 1a) (col. 13, lines 34-41 since the detection system and the excitation system can be placed at different angle with respect to each other then they would each be in a respective housing with the different elements and lens systems).

4. Claims 8, 9 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hjertman et al. (US 6858846) in view of Bentsen et al. (US 6372895).

Re claim 8: Hjertman teaches fluorometer comprising an excitation system (transmitter 6) including an excitation source for producing excitation light capable of causing fluorescence in fluorescent material (col. 10, lines 18-23, lines 33-37) said excitation system further including means for modulating beam with a modulating signal having a modulating frequency (col. 21, lines 1-12). Hjertman does not specifically teach wherein said modulating means is arranged to amplitude modulate said beam. Bensten teaches a fluorometer (Bentsen, fig. 1b), wherein said modulating means is arranged to amplitude modulate said beam (Bentsen, col. 24, lines 55-57). It would have been obvious to one of ordinary skill in the art at the time the invention was made to amplitude modulate the beam of Hjertman as in Bensten in order to provide a detection system that detects only signals that correspond to the modulated signal and

exclude the influence from random factors and disturbances (Hjertman, col. 21, lines 3-5).

Re claim 9: Hjertman as modified by Bentsen teaches a fluorometer (Bentsen, fig. 1b), wherein said modulating means is arranged to modulates said beam by adjusting the power supply of the excitation source in accordance with said modulating signal (Bentsen, col. 24, lines 65-67 and col. 25, lines 1-3).

Re claim 18: Hjertman teaches a fluorometer, wherein said detecting means (receiver 8) is arranged to detect (see fig. 1a), in the electrical signal produced by said light receiving and converting means (col. 10, lines 33-35), a signal component of substantially the same frequency as said modulation frequency (col. 21, lines 12-14). Hjertman does not specifically state that the signal component detected is substantially in phase with the modulation of said beam. Bentsen teaches a fluorometer (Bentsen, fig. 1b), wherein said detecting means (340) is arranged to detect, in the electrical signal produced by said light receiving and converting means (342), a signal component of substantially the same frequency as said modulation frequency and substantially in phase with the modulation of said beam (col. 25, lines 4-8 and lines 39-50 and col. 26, lines 1-20). It would have been obvious to one of ordinary skill in the art at the time the invention was made to have the detection system of Hjertman have a signal component substantially in phase with the modulation signal of the light transmitter as in Bensten in order to provide a detection system that detects only signals that correspond to the modulated signal and exclude the influence from random factors and disturbances (Hjertman, col. 21, lines 3-5).

5. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hjertman et al. (US 6858846) in view of Tokhtuev et al. (WO 03/023379).

Re claim 6: Hjertman teaches a fluorometer, wherein said excitation source comprises a plurality of LEDs arranged in a specific manner (col. 13, lines 55-58). Hjertman does not specifically teach the LEDs are arranged in a generally rectangular and at least one dimensional array. Without a new and unexpected result different arrangement of a plurality of parts is not patentably distinct (2144.04 (VI, B, C)). As further evidenced by Tokhtuev, who teaches a fluorometer comprising a plurality of LEDs arranged in a one dimensional rectangular array (see fig. 3, the two LEDs 27 are in a row therefore one dimensional and generally rectangular). It would have been obvious to one of ordinary skill in the art at the time the invention was made to arrange a plurality of LEDs in such a way as to optimize illumination of the target region being analyzed by increasing the illumination area or illuminating the target with different wavelengths of light in order to produce optimal results of the area being studied.

6. Claims 21 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hjertman et al. (US 6858846) in view of Frungel et al. (US 3666945).

Re claim 21: Hjertman teaches a fluorometer (fig. 1a), wherein the excitation system (6) and the detection system (8) are each provided in a respective housing (all of the elements are in a housing structure), the respective housings being located adjacent one another and arranged such that there is an overlap, during use, between

said generally conical divergent beam excitation beam the excitation system housing and said generally conical convergent detection volume of the detection system housing (col. 13, lines 34-41 since the detection system and the excitation system can be placed at different angle with respect to each other then they would each be in a respective housing with the different elements and lens systems). Hjertman does not specifically teach wherein the respective housings are adjustably interconnected so that the relative angular disposition between the respective housings may be altered such that the distance of said overlap from said respective housings is altered. Frungel teaches a fluorometer (fig. 1 and 2), wherein the respective housings (one for the light source the other for the photo sensor) are adjustably interconnected (supporting pivots, are attached to a support col. 8, lines 20-22, the housing are interconnected to each other through the support and supporting pivots) so that the relative angular disposition between the respective housings may be altered such that the distance of said overlap from said respective housings is altered (col. 5, lines 72-74, see fig. 2). It would have been obvious to one of ordinary skill in the art at the time the invention was made to be able to move the different housings of Hjertman similar to Frungel in order to control where the beam is headed and make sure that it is aligned properly for concise measurements.

Re claim 22: Hjertman as modified by Frungel teaches a fluorometer (Frungel, fig. 2), wherein the respective housings lie generally in a common plane (Hjertman, col. 13, lines 34-35), the relative angular disposition of the housings being alterable about

an axis that is substantially perpendicular to said plane (see fig. 2 the houses are rotated around a perpendicular axis to the plane in which they lie).

7. Claims 24-26, 39, 40 and 42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hjertman et al. (US 6858846) in view of Kolber et al. (US 6121053).

Re claim 24: Hjertman teaches a fluorometer (fig. 1a), wherein said common housing (col. 10, lines 9-10) comprises a window (since the radiation is being emitted out of the housing there would be a window) and at least one inner chamber (there would be at least one inner chamber to contain either the light emitting and detecting components), at least part of the excitation system (6) and at least part of the detection system (8) being located in said at least one inner chamber (there would be at least one inner chamber to contain either the light emitting and detecting components), said at least part of the excitation system being arranged so that said beam is projected, during use, out of the housing through said window (see fig. 1a, the light is projected out of the housing through a window onto the target). Hjertman does not teach at least part of the detection system facing away from said window, and wherein a reflecting surface is located inside the housing facing said window and beyond the detection system with respect to said window, said reflecting surface being arranged to direct light entering, during use, said housing through said window onto said detection system. Kolber teaches a fluorometer wherein said common housing (see fig. 5J, the elements would be contained in a housing) comprises a window (where the light is emitted and fluorescence collected) and at least one inner chamber (the area where the detector 63

and the mirror 62 are located), at least part of the detection system (63) being located in said at least one inner chamber (the area where the detector 63 and the mirror 62 are located), said at least part of the detection system facing away from said window (element 63 is facing away from the window), and wherein a reflecting surface (62) is located inside the housing facing said window (62 is facing the window) and beyond the detection system with respect to said window (the reflecting surface is beyond 63 sensor), said reflecting surface being arranged to direct light entering, during use, said housing through said window onto said detection system (62 directs light to the detection system 63). It would have been obvious to one of ordinary skill in the art to use the detection and mirror system in Kolber with the fluorometer of Hjertman in order to place the light source and detector where ever needed inside the housing to reduce size or cost or change the locations depending on the type of measurement needed.

Re claim 25: Hjertman as modified by Kolber teaches a fluorometer, wherein said at least part of the excitation system and said at least part of the detection system are located substantially co-axially with one another within said housing (Kolber, see fig. 5J).

Re claim 26: Hjertman as modified by Kolber teaches a fluorometer (Hjertman, fig. 1a), in which said at least one inner chamber (there would be at least one inner chamber to contain either the light emitting and detecting component) is located substantially on the longitudinal axis of said housing (Kolber, the area where the detector 63 and the mirror 62 are located, see fig. 5J).

Re claim 39: Hjertman teaches a fluorometer (fig. 1a), wherein said excitation system is arranged such that said beam is capable of causing fluorescence in fluorescent material at a remote distance from the fluorometer (since the beam from the excitation source is diverging in a conical manner as mentioned in claim 1, then the excitation source is capable of reaching up to several meters) (see fig. 1a). Hjertman does not teach the distances of up to several meters. As stated before since the structure of claim 1 and the diverging beam is all within Hjertman then the system is capable of measuring fluorescence up to several meters. Kolber further teaches a fluorometer (fig. 5I and 5J), wherein the lens system is set up in a certain manner in order to have the excitation light reach further distances (col. 15, lines 27-42). It would have been obvious to one of ordinary skill in the art to adjust the lens system or the power output of the LEDs of Hjertman in a similar manner as Kolber in order to have the excitation light reach further distances, which would make the device useful in measuring leaks in container at large distances away from the fluorometer.

Re claim 40: Hjertman as modified by Kolber teaches a fluorometer, wherein said excitation system is arranged such that said beam is capable of causing fluorescence in fluorescent material at distances of between 1 and 15 meters from the fluorometer (Kolber, col. 15, lines 35-42).

Re claim 42: Hjertman teaches fluorometer comprising an excitation system (transmitter 6) including an excitation source for producing excitation light capable of causing fluorescence in fluorescent material (col. 10, lines 18-23, lines 33-37); and a detection system for detecting said fluorescence (receiver 8), wherein said excitation

system comprises an excitation source comprising one or more light emitting diodes (LEDs) (col. 10, lines 18-27), the excitation system further comprising means to cause said excitation light to form, in use, a generally conical divergent beam projecting from the fluorometer (col. 12, lines 9-11) (see fig. 1a the beam is cone shape), said beam causing means comprising at least one lens (col. 21, lines 1-12) arranged to cause said excitation light to form a substantially collimated elongate beam that projects, during use (col. 12, lines 9-11) (see fig. 1a the beam is cone shape), from the fluorometer (this device is used to measure parameters of fluorescence therefore it is a fluorometer), said excitation system further including means for modulating beam with a modulating signal having a modulating frequency (col. 21, lines 1-12), and wherein said detection system (receiver 8) comprises means for receiving light and for converting said received light into a corresponding electrical signal (col. 10, lines 33-35, these elements convert light to an electrical signal), and at least one lens arranged to direct said received light onto said light receiving and converting means (col. 10, lines 48-51 and 62), wherein said at least one lens of the detection system is arranged to provide a generally conical convergent detection volume for the detection system (see fig. 1a the beam is cone converging on the detector), said generally conical detection volume converging in a direction towards said fluorometer and at least partially overlapping with said generally conical divergent beam (see fig. 1a) and wherein said detection system further includes means for detecting (receiver 8), in the electrical signal produced by said light receiving and converting means (col. 10, lines 33-35), a signal component of substantially the same frequency as said modulation frequency (col. 21, lines 12-14), said detecting

means including means for performing spectral analysis of said electrical signal and means for determining the value of a spectral component of said electrical signal corresponding to said modulation frequency (col.12, lines 39-51) (see fig. 3), such that the fluorometer (this device is used to measure parameters of fluorescence therefore it is a fluorometer) is capable of detecting fluorescent material located remotely from the fluorometer (see fig. 1a, the container is remote from the detection system, also since teaches the diverging beam and conical shapes of the transmitted and detection beams the system could be used at larger distances if need be), and wherein the excitation system (6) and the detection system (8) are each provided in a respective housing (all of the elements are in a housing structure), the respective housings being located adjacent one another and arranged such that there is an overlap, during use, between said generally conical divergent beam excitation beam the excitation system housing and said generally conical convergent detection volume of the detection system housing (col. 13, lines 34-41 since the detection system and the excitation system can be placed at different angle with respect to each other then they would each be in a respective housing with the different elements and lens systems), and wherein the respective housings have a respective longitudinal axis, said longitudinal axes being substantially parallel with one another (col. 13, lines 24-39), and said generally conical divergent beam and said generally conical convergent detection volume are substantially aligned with said respective longitudinal axis (see fig. 1a) (col. 13, lines 34-41 since the detection system and the excitation system can be placed at different angle with respect to each other then they would each be in a respective housing with the different

elements and lens systems). Hjertman does not specifically mention that the lens is a collimating lens and that the remote distance is up to several meters. It is well known in the art to use a basic converging lens and place the light source at the principal focus of the lens to get a collimated beam output and if one wanted diverging beams one would move the light source closer to the lens itself. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use a collimating lens with the excitation source of Hjertman and still maintain the diverging conical shape of the beam and having further control of how much or little the beam is diverged dependent on the object or scene being illuminated for measurement (Hjertman, col. 12, lines 10-11). Hjertman does not teach the distances of up to several meters. As stated before since the structure of claim 1 and the diverging beam is all within Hjertman then the system is capable of measuring fluorescence up to several meters. Kolber further teaches a fluorometer (fig. 5I and 5J), wherein the lens system is set up in a certain manner in order to have the excitation light reach further distances (col. 15, lines 27-42). It would have been obvious to one of ordinary skill in the art to adjust the lens system or the power output of the LEDs of Hjertman in a similar manner as Kolber in order to have the excitation light reach further distances, which would make the device useful in measuring leaks in container at large distances away from the fluorometer.

8. Claims 27-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hjertman et al. (US 6858846) in view of Bernstein et al. (US 4496839).

Re claim 27: Hjertman teaches a fluorometer (fig. 1a), wherein said common housing (col. 10, lines 9-10) comprises a window (since the radiation is being emitted out of the housing there would be a window) and at least one inner chamber (there would be at least one inner chamber to contain either the light emitting and detecting components), at least part of the excitation system (6) and at least part of the detection system (8) being located in said at least one inner chamber (there would be at least one inner chamber to contain either the light emitting and detecting components), said at least part of the excitation system being arranged so that said beam is projected, during use, out of the housing through said window (see fig. 1a, the light is projected out of the housing through a window onto the target). Hjertman does not specifically teach wherein said common housing comprises a window and at least two inner chambers, at least part of the excitation system being located in a first inner chamber and at least part of the detection system being located in a second inner chamber, said at least part of the excitation system being arranged so that said beam is projected, during use, out of tile housing through said window, said second inner chamber being located beyond said first inner chamber with respect to said window, said at least part of the detection system facing towards said window, and wherein a reflecting system is located between the first and second inner chambers and is arranged to direct light entering, during use, said housing through said window onto said detection system. Bernstein teaches a spectroscopy device (fig. 1), wherein said common housing (surround all elements in fig. 1 except 18, 36, 38, 42, 44) comprises a window (where beams are exiting) and at least two inner chambers (inside collecting optics and behind collecting optical), at least

part of the excitation system (16, 14, and 12) being located in a first inner chamber (beam emitted from 16) and at least part of the detection system (26) being located in a second inner chamber (behind collecting optics), said at least part of the excitation system being arranged so that said beam is projected, during use, out of the housing through said window (see fig. 1), said second inner chamber being located beyond said first inner chamber with respect to said window (26 is beyond (behind) collecting optics, window portion is in the front of the collecting optics), said at least part of the detection system facing towards said window (see fig. 1), and wherein a reflecting system (22 and 24) is located between the first and second inner chambers and is arranged to direct light entering, during use, said housing through said window onto said detection system (see fig. 1). It would have been obvious to one of ordinary skill in the art to use the mirror system in Bernstein with the fluorometer of Hjertman in order to place the light source and detector where ever needed inside the housing to reduce size or cost or change the locations depending on the type of measurement needed.

Re claim 28: Hjertman as modified by Bernstein teaches a fluorometer (Bernstein, fig. 1), wherein said reflecting system comprises a first reflecting surface (22), facing towards said window (see fig. 1) and a second reflecting surface (24) facing away from said window (see fig. 1), the first reflecting surface being arranged to direct light entering, during use, said housing through said window onto said second reflecting surface, said second reflecting surface being arranged to direct said light onto said detection system (see fig. 1 and beam direction).

Re claim 29: Hjertman as modified by Bernstein teaches a fluorometer (Bernstein, fig. 1), wherein said first reflecting surface (22) is shaped to define an aperture (the hole in surface), said detection system being positioned to receive light from said second reflecting surface through said aperture (see fig. 1).

Re claim 30: Hjertman as modified by Bernstein teaches a fluorometer, wherein said reflecting system comprises a Cassegrainian mirror system (Bernstein, the mirror system with 22 and 24 with the hole in 22 is a Cassegrainian mirror system).

9. Claim 31 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hjertman et al. (US 6858846) in view of Chudnovsky (US 6157033).

Re claim 31: Hjertman teaches fluorometer comprising an excitation system (transmitter 6) including an excitation source for producing excitation light capable of causing fluorescence in fluorescent material (col. 10, lines 18-23, lines 33-37); and a detection system for detecting said fluorescence (receiver 8), wherein said excitation system comprises an excitation source comprising one or more light emitting diodes (LEDs) (col. 10, lines 18-27), the fluorometer (this device is used to measure parameters of fluorescence therefore it is a fluorometer) is capable of detecting fluorescent material located remotely from the fluorometer (see fig. 1a, the container is remote from the detection system, also since teaches the diverging beam and conical shapes of the transmitted and detection beams the system could be used at larger distances if need be). Hjertman does not teach a fluorometer, further including a laser device carried by the fluorometer and positioned to project, during use, a laser beam in

a direction generally parallel, or aligned, with the excitation beam. Chudnovsky teaches a leak detection system (fig. 1), further including a laser device (12) carried by the fluorometer and positioned to project, during use, a laser beam in a direction generally parallel, or aligned, with the excitation beam (col. 3, lines 18-19). It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the laser pointer of Chudnovsky with the fluorometer of Hjertman in order to direct the excitation beam to certain locations for precision measurements.

10. Claim 32 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hjertman et al. (US 6858846) in view of Field (US 20050174793).

Re claim 32: Hjertman teaches a fluorometer (fig. 1a), wherein fluorometer comprises at least one housing (col. 10, lines 9-10), the or each housing comprising a window through which said excitation beam is projected during use and/or though which light is received during use (since the radiation is being emitted out of the housing there would be a window). Hjertman does not teach wherein said excitation source is slidably moveable towards and away from the window of the housing in which it is located. Field teaches a light source device (fig. 1 and 2), wherein a light source (18) is slidably moveable towards and away from the window (16) of the housing (10) in which it is located (see fig. 1 and 2). It would have been obvious to one of ordinary skill in the art at the time the invention was made to use a moveable light source as in Field with the fluorometer of Hjertman in order to control how the beam passes through the window

area, whether as a collimated beam or a diverging beam over an area, dependent on the type of measurement needed.

11. Claim 33 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hjertman et al. (US 6858846) in view of Zielke et al. (US 3554653).

Re claim 33: Hjertman teaches a fluorometer (fig. 1a), wherein fluorometer comprises at least one housing (col. 10, lines 9-10), the or each housing comprising a window through which said excitation beam is projected during use and/or though which light is received during use (since the radiation is being emitted out of the housing there would be a window). Hjertman does not teach wherein at least one lens of said lens system is slidably moveable towards and away from the window of the housing in which it is located. Zielke teaches an autocollimator (fig. 1), wherein at least one lens (7) of said lens system is slidably moveable towards and away from the window (lens 2) of the housing in which it is located (see fig. 1). It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the moveable lens of Zielke with the fluorometer of Hjertman in order to control how the beam passes through the window area, whether as a collimated beam, a diverging beam over an area, moved to a different location, dependent on the type of measurement needed.

12. Claim 34 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hjertman et al. (US 6858846) as modified by Kolber et al. (US 6121053) as applied to claim 24 above, and further in view of Michael (US 4005605).

Re claim 34: Hjertman as modified by Kolber teaches a fluorometer (Hjertman, fig. 1a), wherein the device comprises at least one housing (Kolber, there would be a housing around the elements in fig. 5J), the or each housing comprising a window (Kolber, the portion where excitation light is emitted and fluorescent light is collected, see fig. 5J) through which said excitation beam is projected during use (Hjertman, see fig. 1a) and/or though which light is received during use (Kolber, see fig. 5J). Hjertman as modified by Kolber does not teach wherein the reflecting element slideable. Michael teaches a detection system (fig. 2 and 3) wherein at least one reflecting surface is slidably moveable towards and away from the window of the housing in which it is located (Michael, see fig. 3, the mirror is tilted toward the window). It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the slideable mirror in Michael with the optical system of Hjertman as modified by Kolber in order to have greater control of where the beams of fluorescence are being sent, to ensure all the fluorescence is detected by the detector providing for more accurate measurements.

13. Claim 35 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hjertman et al. (US 6858846) as modified Bentsen et al. (US 6372895) as applied to claim 18 above, and further in view of Chudnovsky (US 6157033).

Re claim 35: Hjertman as modified by Bensten teaches a fluorometer, further including means for determining the amplitude of said signal component, and determining when said amplitude exceeds a threshold (Hjertman, col. 20, lines 23-43).

Hjertman as modified by Bensten does not teach a means for generating an alarm. Chudnovsky teaches a leak detection system (fig. 1), further including means for determining the intensity of said signal component, and means for generating an alarm when said intensity exceeds a threshold (col. 2 and 3, lines 66-67 and lines 1-29). It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the alarm of Chudnovsky with the fluorometer device of Hjertman as modified by Bensten in order to have a way of communicating results or information found by the device to the user operating the device.

14. Claims 36 and 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hjertman et al. (US 6858846) in view of Geiger (US 5947051).

Re claim 36: Hjertman teaches a fluorometer (this device is used to measure parameters of fluorescence therefore it is a fluorometer) measuring fluorescence from a container (see fig. 1a). Hjertman does not teach a vehicle for use underwater, the vehicle carrying a fluorometer. Geiger teaches an underwater vehicle, the vehicle carrying a fluorometer (col. 28, lines 1-17, fig. 24). It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the fluorometer of Hjertman on the underwater vehicle of Geiger in order to find leaks in steal structures under the water.

Re claim 37: Hjertman as modified by Geiger teaches a vehicle (Geiger fig. 24), wherein the vehicle includes at least one first moveable structure for carrying, during use, a camera (Geiger, 36) or lamp, the fluorometer (197 and 198) being carried by a

second moveable structure, wherein said at least one first moveable structure and said second moveable structure are coupled electrically and/or mechanically so that the movement of the second structure is synchronized with the movement of said at least one first structure (Geiger, 56 is a robotic arm between the two structure holding the fluorometer 197 and 198 and the camera 36).

15. Claim 43 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hjertman et al. (US 6858846) as modified by Kolber et al. (US 6121053) as applied to claim 42 above, and further in view of Frungel et al. (US 3666945).

Re claim 43: Hjertman as modified by Kolber teaches a fluorometer (fig. 1a), wherein the excitation system (6) and the detection system (8) are each provided in a respective housing (all of the elements are in a housing structure), the respective housings being located adjacent one another and arranged such that there is an overlap, during use, between said generally conical divergent beam excitation beam the excitation system housing and said generally conical convergent detection volume of the detection system housing (col. 13, lines 34-41 since the detection system and the excitation system can be placed at different angle with respect to each other then they would each be in a respective housing with the different elements and lens systems). Hjertman as modified by Kolber does not specifically teach wherein the respective housings are adjustably interconnected so that the relative angular disposition between the respective housings may be altered such that the distance of said overlap from said respective housings is altered. Frungel teaches a fluorometer (fig. 1 and 2), wherein the

respective housings (one for the light source the other for the photo sensor) are adjustably interconnected (supporting pivots, are attached to a support col. 8, lines 20-22, the housing are interconnected to each other through the support and supporting pivots) so that the relative angular disposition between the respective housings may be altered such that the distance of said overlap from said respective housings is altered (col. 5, lines 72-74, see fig. 2). It would have been obvious to one of ordinary skill in the art at the time the invention was made to be able to move the different housings of Hjertman as modified by Kolber similar to Frungel in order to control where the beam is headed and make sure that it is aligned properly for concise measurements.

Response to Arguments

16. Applicant's arguments with respect to claims 1, 4-6, 8, 9, 12, 16, 18, 20-37, and 39-43 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JENNIFER BENNETT whose telephone number is (571)270-3419. The examiner can normally be reached on Monday - Friday 0730 - 1700 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Georgia Epps can be reached on 571-272-2328. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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/Que T. Le/
Primary Examiner, Art Unit 2878

/J. B./